Adhesion-induced lateral phase separation of multi-component membranes(New Frontiers in Colloidal Physics : A Bridge between Micro- and Macroscopic Concepts in Soft Matter)

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Adhesion-induced lateral phase separation of multi-component membranes

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We present a theory of adhesion-induced lateral phase separation for membranes with short stickers, long stickers and repellers which are in contact with the substrate. The membranes are confined between two hard walls and the effect of confinement on lateral phase separation is investigated. (i) In the absence of repellers, the equilibrium phase behavior of these membranes is investigated using mean field approximation. It is found that as the distance between the two walls decreases, the stickers critical potential depth for lateral phase separation increases. (ii) In the presence of repellers, the phase property of the system relies on the strength of the repellers potential height. Fixing the distance between the two hard walls, the dependence of the stickers critical potential depth of lateral phase separation is investigated as a function of repellers potential height. We find that the stickers critical potential depth increases as the strength of the repellers potential height increases. We also explored how the critical potential depth of lateral phase separation behaves as we vary the distance between the two hard walls. The numerical analysis shows that as the distance between the hard walls decreases, the stickers critical potential depth decreases for fixed value of repellers potential height.